

Anti-Microbial Resistance (AMR) problem

Mains: GSII - Health

Why in news?

A recent study of hospitalised patients across India has found that infections caused by antibiotic-resistant “Gram-negative” bacteria are more likely to be fatal and more expensive.

What is Anti-Microbial resistance?

- **Antimicrobial resistance (AMR)** – It occurs when germs like bacteria, viruses, fungi, and parasites change and stop responding to the medicines designed to kill them.
- AMR specifically refers to resistance against antibiotics, antivirals, antifungals and antiparasitic drugs.
- Therefore, antibiotic resistance is one type of AMR.
- **Gram-negative bacteria** – These are a group of bacteria that can cause infections in different parts of the body, including the lungs, urinary tract etc.
- These include pathogens such as:
 - Escherichia coli (commonly known as E. coli),
 - Klebsiella pneumoniae,
 - Acinetobacter baumannii and
 - Pseudomonas aeruginosa.
- One important group of antibiotics used for serious infections is **carbapenems**.
- carbapenem-resistant Gram-negative bacteria are particularly concerning as they have very few effective treatment options.
- **Recent ICMR study** – across 20 tertiary-care hospitals (2022–2025), involving 1.59 lakh patients, highlights the growing clinical and economic burden of such infections.

Key Observations of the Study

- 61%+ of Gram-negative infections in the tertiary-care study population were carbapenem-resistant.
- Resistance was associated with a 16–43% higher relative risk of death across E. coli, Klebsiella pneumoniae, Acinetobacter baumannii and Pseudomonas aeruginosa.
- Bloodstream infections involving resistant organisms had mortality of around 39–51%.
- Antibiotic costs alone were 1.1–2 times higher for resistant infections.
- >85% of bloodstream infections were classified as healthcare-associated.

Note: These figures come from tertiary-care hospitals and therefore should not be treated as representative of the entire Indian population.

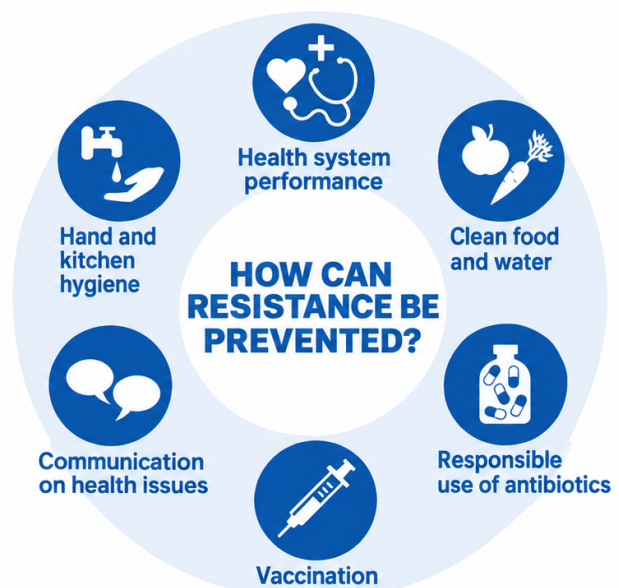
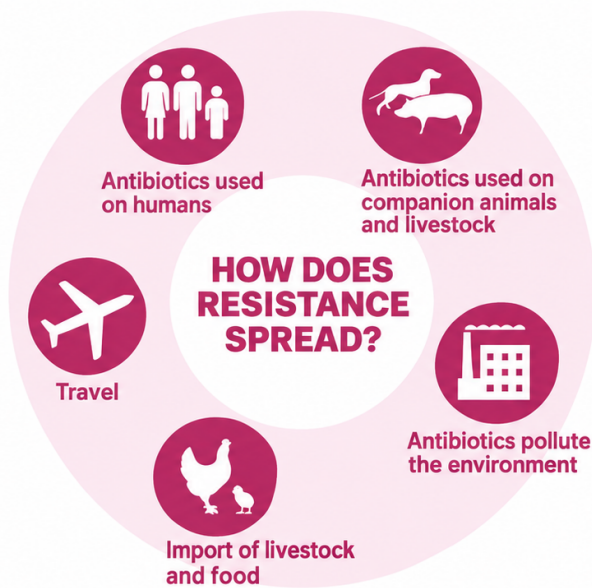
Why are Carbapenem-Resistant Infections a Concern?

- **Fewer effective drugs** - Carbapenem resistance eliminates one of the most important treatment options leaving doctors with limited alternatives.
- **Delayed appropriate treatment** - Resistance may take time to identify, causing delays in giving an effective antibiotic and allowing the infection to worsen.
- **Higher complications & mortality** - Inadequately treated resistant infections can rapidly progress to complications such as sepsis and organ failure.
- **Higher healthcare costs** - Resistant infections often require costlier antibiotics, longer hospital stays, intensive care increasing the financial burden.

ANTIBIOTIC RESISTANCE (antimicrobial resistance)



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What are the factors driving AMR?

- **Antibiotic selection pressure** - Excessive or inappropriate antibiotic use encourages survival of resistant bacteria.
- **Healthcare-associated transmission** - Hospitals can become reservoirs for resistant pathogens. Poor infection-control practices facilitate transmission.
- **Invasive medical devices** - Prolonged use of Catheters, ventilators and other devices increase can facilitate infection risks.
- **Delayed diagnosis** - Conventional diagnosis may take time. Delayed identification of resistance can result in inappropriate initial therapy.
- **Inadequate infection prevention** - Poor hand hygiene, Inadequate environmental cleaning, Weak surgical infection prevention, Improper device insertion/removal.
- **Limited treatment options** - Resistance to last-line antibiotics leaves clinicians with fewer effective alternatives.

What are the implications of AMR?

- **Public Health** - It results in increased mortality and morbidity. Particularly dangerous in bloodstream infections and critically ill patients.

- **Longer hospitalisation** - Increased diagnostic and prolonged supportive-care requirements.
- **Economic burden** - Additional costs from ICU care, investigations, procedures and prolonged hospitalisation.
- **Threat to modern medicine** - AMR can undermine the safety of Major surgeries, Cancer chemotherapy, Organ transplantation, Intensive-care treatment.
- **Developmental concern** - AMR can reduce productivity and impose a broader economic burden, making it not merely a medical issue but a developmental challenge.

What needs to be done to address AMR?

- **Better surveillance** - Move from isolate-based AMR surveillance to integrated surveillance that connects laboratory results with patient outcomes, and treatment.
- **Accurate diagnostics** - To distinguish bacterial infection from non-bacterial illness and identify resistance early.
- **Responsible management** - Antimicrobial stewardship has to become routine clinical practice—not an optional hospital programme.
- **Attention to infection prevention** - It must receive as much attention as antibiotic prescribing, particularly because these infections are healthcare-associated.
- **New treatments** - Responsible access to effective newer antimicrobials, coupled with stewardship, to make these drugs remain effective when patients genuinely need them.

What lies ahead?

- AMR cannot be solved by discovering another antibiotic every time an old one fails.
- It is needed to prevent infections, diagnose them early and preserve the antibiotics we still have.

Reference

[The Indian Express| India's AMR problem](#)